

SEQUENCE LISTING

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<130> 10278/009001

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<212> DNA

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<221> CDS

<222> (19)...(4353)

<223> Modified HUN2AN Factor VIII

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Cys	Leu	Leu	Arg	Phe	Cys	Phe	Ser	Ala	Thr	Arg	Arg	Tyr	Tyr	Leu	Gly	
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gcc	gtg	gag	ctg	agc	tgg	gac	tac	atg	cag	agc	gac	ctg	ggc	gag	ctg	147
Ala	Val	Glu	Leu	Ser	Trp	Asp	Tyr	Met	Gln	Ser	Asp	Leu	Gly	Glu	Leu	
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Pro	Val	Asp	Ala	Arg	Phe	Pro	Pro	Arg	Val	Pro	Lys	Ser	Phe	Pro	Phe	
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Asn	Thr	Ser	Val	Val	Tyr	Lys	Lys	Thr	Leu	Phe	Val	Glu	Phe	Thr	Asp	
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His	Leu	Phe	Asn	Ile	Ala	Lys	Pro	Arg	Pro	Pro	Trp	Met	Gly	Leu	Leu	
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ggc	ccc	acc	atc	cag	gcc	gag	gtg	tac	gac	acc	gtg	gtg	atc	acc	ctg	339
Gly	Pro	Thr	Ile	Gln	Ala	Glu	Val	Tyr	Asp	Thr	Val	Val	Ile	Thr	Leu	
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Tyr	Trp	Lys	Ala	Ser	Glu	Gly	Ala	Glu	Tyr	Asp	Asp	Gln	Thr	Ser	Gln	
125						130					135					

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gtg tgg cag gtg ctg aag gag aac ggc ccc atg gcc agc gac ccc ctg Val Trp Gln Val Leu Lys Glu Asn Gly Pro Met Ala Ser Asp Pro Leu 160 165 170	531
tgc ctg acc tac agc tac ctg agc cac gtg gac ctg gtg aag gac ctg Cys Leu Thr Tyr Ser Tyr Leu Ser His Val Asp Leu Val Lys Asp Leu 175 180 185	579
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cgc atc cac ccc cag agc tgg gtg cac cag atc gcc ctg cgc atg gag 4323
Arg Ile His Pro Gln Ser Trp Val His Gln Ile Ala Leu Arg Met Glu
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ttt 4376

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<223> Modified HUN2AN Factor VIII

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Trp Asp Tyr Met Gln Ser Asp Leu Gly Glu Leu Pro Val Asp Ala Arg 35 40 45
Phe Pro Pro Arg Val Pro Lys Ser Phe Pro Phe Asn Thr Ser Val Val 50 55 60
Tyr Lys Lys Thr Leu Phe Val Glu Phe Thr Asp His Leu Phe Asn Ile 65 70 75 80
Ala Lys Pro Arg Pro Pro Trp Met Gly Leu Leu Gly Pro Thr Ile Gln 85 90 95
Ala Glu Val Tyr Asp Thr Val Val Ile Thr Leu Lys Asn Met Ala Ser 100 105 110
His Pro Val Ser Leu His Ala Val Gly Val Ser Tyr Trp Lys Ala Ser 115 120 125
Glu Gly Ala Glu Tyr Asp Asp Gln Thr Ser Gln Arg Glu Lys Glu Asp 130 135 140
Asp Lys Val Phe Pro Gly Gly Ser His Thr Tyr Val Trp Gln Val Leu 145 150 155 160
Lys Glu Asn Gly Pro Met Ala Ser Asp Pro Leu Cys Leu Thr Tyr Ser 165 170 175
Tyr Leu Ser His Val Asp Leu Val Lys Asp Leu Asn Ser Gly Leu Ile 180 185 190
Gly Ala Leu Leu Val Cys Arg Glu Gly Ser Leu Ala Lys Glu Lys Thr 195 200 205
Gln Thr Leu His Lys Phe Ile Leu Leu Phe Ala Val Phe Asp Glu Gly 210 215 220
Lys Ser Trp His Ser Glu Thr Lys Asn Ser Leu Met Gln Asp Arg Asp 225 230 235 240
Ala Ala Ser Ala Arg Ala Trp Pro Lys Met His Thr Val Asn Gly Tyr 245 250 255
Val Asn Arg Ser Leu Pro Gly Leu Ile Gly Cys His Arg Lys Ser Val 260 265 270
Tyr Trp His Val Ile Gly Met Gly Thr Thr Pro Glu Val His Ser Ile 275 280 285
Phe Leu Glu Gly His Thr Phe Leu Val Arg Asn His Arg Gln Ala Ser 290 295 300
Leu Glu Ile Ser Pro Ile Thr Phe Leu Thr Ala Gln Thr Leu Leu Met 305 310 315 320
Asp Leu Gly Gln Phe Leu Leu Phe Cys His Ile Ser Ser His Gln His 325 330 335
Asp Gly Met Glu Ala Tyr Val Lys Val Asp Ser Cys Pro Glu Glu Pro 350

Gln Leu Arg Met Lys Asn Asn Glu Glu Ala Glu Asp Tyr Asp Asp Asp
355 360 365
Leu Thr Asp Ser Glu Met Asp Val Val Arg Phe Asp Asp Asp Asn Ser
370 375 380
Pro Ser Phe Ile Gln Ile Arg Ser Val Ala Lys Lys His Pro Lys Thr
385 390 395 400
Trp Val His Tyr Ile Ala Ala Glu Glu Asp Trp Asp Tyr Ala Pro
405 410 415
Leu Val Leu Ala Pro Asp Asp Arg Ser Tyr Lys Ser Gln Tyr Leu Asn
420 425 430
Asn Gly Pro Gln Arg Ile Gly Arg Lys Tyr Lys Lys Val Arg Phe Met
435 440 445
Ala Tyr Thr Asp Glu Thr Phe Lys Thr Arg Glu Ala Ile Gln His Glu
450 455 460
Ser Gly Ile Leu Gly Pro Leu Leu Tyr Gly Glu Val Gly Asp Thr Leu
465 470 475 480
Leu Ile Ile Phe Lys Asn Gln Ala Ser Arg Pro Tyr Asn Ile Tyr Pro
485 490 495
His Gly Ile Thr Asp Val Arg Pro Leu Tyr Ser Arg Arg Leu Pro Lys
500 505 510
Gly Val Lys His Leu Lys Asp Phe Pro Ile Leu Pro Gly Glu Ile Phe
515 520 525
Lys Tyr Lys Trp Thr Val Thr Val Glu Asp Gly Pro Thr Lys Ser Asp
530 535 540
Pro Arg Cys Leu Thr Arg Tyr Ser Ser Phe Val Asn Met Glu Arg
545 550 555 560
Asp Leu Ala Ser Gly Leu Ile Gly Pro Leu Leu Ile Cys Tyr Lys Glu
565 570 575
Ser Val Asp Gln Arg Gly Asn Gln Ile Met Ser Asp Lys Arg Asn Val
580 585 590
Ile Leu Phe Ser Val Phe Asp Glu Asn Arg Ser Trp Tyr Leu Thr Glu
595 600 605
Asn Ile Gln Arg Phe Leu Pro Asn Pro Ala Gly Val Gln Leu Glu Asp
610 615 620
Pro Glu Phe Gln Ala Ser Asn Ile Met His Ser Ile Asn Gly Tyr Val
625 630 635 640
Phe Asp Ser Leu Gln Leu Ser Val Cys Leu His Glu Val Ala Tyr Trp
645 650 655
Tyr Ile Leu Ser Ile Gly Ala Gln Thr Asp Phe Leu Ser Val Phe Phe
660 665 670
Ser Gly Tyr Thr Phe Lys His Lys Met Val Tyr Glu Asp Thr Leu Thr
675 680 685
Leu Phe Pro Phe Ser Gly Glu Thr Val Phe Met Ser Met Glu Asn Pro
690 695 700
Gly Leu Trp Ile Leu Gly Cys His Asn Ser Asp Phe Arg Asn Arg Gly
705 710 715 720
Met Thr Ala Leu Leu Lys Val Ser Ser Cys Asp Lys Asn Thr Gly Asp
725 730 735
Tyr Tyr Glu Asp Ser Tyr Glu Asp Ile Ser Ala Tyr Leu Leu Ser Lys
740 745 750
Asn Asn Ala Ile Glu Pro Arg Leu Glu Ile Thr Arg Thr Thr Leu
755 760 765
Gln Ser Asp Gln Glu Glu Ile Asp Tyr Asp Asp Thr Ile Ser Val Glu
770 775 780
Met Lys Lys Glu Asp Phe Asp Ile Tyr Asp Glu Asp Glu Asn Gln Ser
785 790 795 800
Pro Arg Ser Phe Gln Lys Lys Thr Arg His Tyr Phe Ile Ala Ala Val
805 810 815
Glu Arg Leu Trp Asp Tyr Gly Met Ser Ser Ser Pro His Val Leu Arg
820 825 830
Asn Arg Ala Gln Ser Gly Ser Val Pro Gln Phe Lys Lys Val Val Phe
835 840 845
Gln Glu Phe Thr Asp Gly Ser Phe Thr Gln Pro Leu Tyr Arg Gly Glu
850

Ser Ser Gln Asp Gly His Gln Trp Thr Leu Phe Phe Gln Asn Gly Lys
 1380 1385 1390
 Val Lys Val Phe Gln Gly Asn Gln Asp Ser Phe Thr Pro Val Val Asn
 1395 1400 1405
 Ser Leu Asp Pro Pro Leu Leu Thr Arg Tyr Leu Arg Ile His Pro Gln
 1410 1415 1420
 Ser Trp Val His Gln Ile Ala Leu Arg Met Glu Val Leu Gly Cys Glu
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 Ala Gln Asp Leu Tyr
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<220>
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 <222> (19)...(4359)
 <223> Modified HUN2AN Factor VIII

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 Cys Leu Leu Arg Phe Cys Phe Ser Ala Thr Arg Arg Tyr Tyr Leu Gly
 15 20 25

gcc gtg gag ctg agc tgg gac tac atg cag agc gac ctg ggc gag ctg 147
 Ala Val Glu Leu Ser Trp Asp Tyr Met Gln Ser Asp Leu Gly Glu Leu
 30 35 40

ccc gtg gac gcc cgc ttc ccc ccc cgc gtg ccc aag agc ttc ccc ttc 195
 Pro Val Asp Ala Arg Phe Pro Pro Arg Val Pro Lys Ser Phe Pro Phe
 45 50 55

aac acc agc gtg gtg tac aag aag acc ctg ttc gtg gag ttc acc gac 243
 Asn Thr Ser Val Val Tyr Lys Lys Thr Leu Phe Val Glu Phe Thr Asp
 60 65 70 75

cac ctg ttc aac atc gcc aag ccc cgc ccc tgg atg ggc ctg ctg 291
 His Leu Phe Asn Ile Ala Lys Pro Arg Pro Pro Trp Met Gly Leu Leu
 80 85 90

ggc ccc acc atc cag gcc gag gtg tac gac acc gtg gtg atc acc ctg 339
 Gly Pro Thr Ile Gln Ala Glu Val Tyr Asp Thr Val Val Ile Thr Leu
 95 100 105

aag aac atg gcc agc cac ccc gtg agc ctg cac gcc gtg ggc gtg agc 387
 Lys Asn Met Ala Ser His Pro Val Ser Leu His Ala Val Gly Val Ser
 110 115 120

tac tgg aag gcc agc gag ggc gcc gag tac gac gac cag acc agc cag 435
 Tyr Trp Lys Ala Ser Glu Gly Ala Glu Tyr Asp Asp Gln Thr Ser Gln
 125 130 135

cgc gag aag gag gac aag gtg ttc ccc ggc ggc agc cac acc tac 483
 Arg Glu Lys Glu Asp Asp Lys Val Phe Pro Gly Gly Ser His Thr Tyr
 155

gtg tgg cag gtg ctg aag gag aac ggc ccc atg gcc agc gac ccc ctg Val Trp Gln Val Leu Lys Glu Asn Gly Pro Met Ala Ser Asp Pro Leu 160 165 170	531
tgc ctg acc tac agc tac ctg agc cac gtg gac ctg gtg aag gac ctg Cys Leu Thr Tyr Ser Tyr Leu Ser His Val Asp Leu Val Lys Asp Leu 175 180 185	579
aac agc ggc ctg atc ggc gcc ctg ctg gtg tgc cgc gag ggc agc ctg Asn Ser Gly Leu Ile Gly Ala Leu Leu Val Cys Arg Glu Gly Ser Leu 190 195 200	627
gcc aag gag aag acc cag acc ctg cac aag ttc atc ctg ctg ttc gcc Ala Lys Glu Lys Thr Gln Thr Leu His Lys Phe Ile Leu Leu Phe Ala 205 210 215	675
gtg ttc gac gag ggc aag agc tgg cac agc gag acc aag aac agc ctg Val Phe Asp Glu Gly Lys Ser Trp His Ser Glu Thr Lys Asn Ser Leu 220 225 230 235	723
atg cag gac cgc gac gcc agc gcc cgc gcc tgg ccc aag atg cac Met Gln Asp Arg Asp Ala Ala Ser Ala Arg Ala Trp Pro Lys Met His 240 245 250	771
acc gtg aac ggc tac gtg aac cgc agc ctg ccc ggc ctg atc ggc tgc Thr Val Asn Gly Tyr Val Asn Arg Ser Leu Pro Gly Leu Ile Gly Cys 255 260 265	819
cac cgc aag agc gtg tac tgg cac gtg atc ggc atg ggc acc acc ccc His Arg Lys Ser Val Tyr Trp His Val Ile Gly Met Gly Thr Thr Pro 270 275 280	867
gag gtg cac agc atc ttc ctg gag ggc cac acc ttc ctg gtg cgc aac Glu Val His Ser Ile Phe Leu Glu Gly His Thr Phe Leu Val Arg Asn 285 290 295	915
cac cgc cag gcc agc ctg gag atc agc ccc atc acc ttc ctg acc gcc His Arg Gln Ala Ser Leu Glu Ile Ser Pro Ile Thr Phe Leu Thr Ala 300 305 310 315	963
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gac tac gac gac ctg acc gac agc gag atg gac gtg gtg cgc ttc Asp Tyr Asp Asp Leu Thr Asp Ser Glu Met Asp Val Val Arg Phe 365 370 375	1155
gac gac gac aac agc ccc agc ttc atc cag atc cgc agc gtg gcc aag Asp Asp Asp Asn Ser Pro Ser Phe Ile Gln Ile Arg Ser Val Ala Lys 380 385 390 395	1203
aag cac ccc aag acc tgg gtg cac tac atc gcc gag gag gag gac Lys His Pro Lys Thr Trp Val His Tyr Ile Ala Ala Glu Glu Asp 1251	

tgg gac tac gcc ccc ctg gtg ctg gcc ccc gac gac cgc agc tac aag Trp Asp Tyr Ala Pro Leu Val Leu Ala Pro Asp Asp Arg Ser Tyr Lys 415	420	425	1299	
agc cag tac ctg aac aac ggc ccc cag cgc atc ggc cgc aag tac aag Ser Gln Tyr Leu Asn Asn Gly Pro Gln Arg Ile Gly Arg Lys Tyr Lys 430	435	440	1347	
aag gtg cgc ttc atg gcc tac acc gac gag acc ttc aag acc cgc gag Lys Val Arg Phe Met Ala Tyr Thr Asp Glu Thr Phe Lys Thr Arg Glu 445	450	455	1395	
gcc atc cag cac gag agc ggc atc ctg ggc ccc ctg ctg tac ggc gag Ala Ile Gln His Glu Ser Gly Ile Leu Gly Pro Leu Leu Tyr Gly Glu 460	465	470	475	1443
gtg ggc gac acc ctg ctg atc atc ttc aag aac cag gcc agc cgc ccc Val Gly Asp Thr Leu Leu Ile Phe Lys Asn Gln Ala Ser Arg Pro 480	485	490	1491	
tac aac atc tac ccc cac ggc atc acc gac gtg cgc ccc ctg tac agc Tyr Asn Ile Tyr Pro His Gly Ile Thr Asp Val Arg Pro Leu Tyr Ser 495	500	505	510	1539
cgc cgc ctg ccc aag ggc gtg aag cac ctg aag gac ttc ccc atc ctg Arg Arg Leu Pro Lys Gly Val Lys His Leu Lys Asp Phe Pro Ile Leu 510	515	520	525	1587
ccc ggc gag atc ttc aag tac aag tgg acc gtg acc gtg gag gac ggc Pro Gly Glu Ile Phe Lys Tyr Lys Trp Thr Val Thr Val Glu Asp Gly 525	530	535	540	1635
ccc acc aag agc gac ccc cgc tgc ctg acc cgc tac tac agc agc ttc Pro Thr Lys Ser Asp Pro Arg Cys Leu Thr Arg Tyr Tyr Ser Ser Phe 540	545	550	555	1683
gtg aac atg gag cgc gac ctg gcc agc ggc ctg atc ggc ccc ctg ctg Val Asn Met Glu Arg Asp Leu Ala Ser Gly Leu Ile Gly Pro Leu Leu 560	565	570	575	1731
atc tgc tac aag gag agc gtg gac cag cgc ggc aac cag atc atg agc Ile Cys Tyr Lys Glu Ser Val Asp Gln Arg Gly Asn Gln Ile Met Ser 575	580	585	590	1779
gac aag cgc aac gtg atc ctg ttc agc gtg ttc gac gag aac cgc agc Asp Lys Arg Asn Val Ile Leu Phe Ser Val Phe Asp Glu Asn Arg Ser 590	595	600	605	1827
tgg tac ctg acc gag aac atc cag cgc ttc ctg ccc aac ccc gcc ggc Trp Tyr Leu Thr Glu Asn Ile Gln Arg Phe Leu Pro Asn Pro Ala Gly 605	610	615	620	1875
gtg cag ctg gag gac ccc gag ttc cag gcc agc aac atc atg cac agc Val Gln Leu Glu Asp Pro Glu Phe Gln Ala Ser Asn Ile Met His Ser 625	630	635	640	1923
atc aac ggc tac gtg ttc gac agc ctg cag ctg agc gtg tgc ctg cac Ile Asn Gly Tyr Val Phe Asp Ser Leu Gln Leu Ser Val Cys Leu His 640	645	650	655	1971
gag gtg gcc tac tgg tac atc ctg agc atc ggc gcc cag acc gac ttc Glu Val Ala Tyr Trp Tyr Ile Leu Ser Ile Gly Ala Gln Thr Asp Phe 660	665	670	675	2019

ctg agc gtg ttc agc ggc tac acc ttc aag cac aag atg gtg tac Leu Ser Val Phe Phe Ser Gly Tyr Thr Phe Lys His Lys Met Val Tyr 670 675 680	2067
gag gac acc ctg acc ctg ttc ccc ttc agc ggc gag acc gtg ttc atg Glu Asp Thr Leu Thr Leu Phe Pro Phe Ser Gly Glu Thr Val Phe Met 685 690 695	2115
agc atg gag aac ccc ggc ctg tgg atc ctg ggc tgc cac aac agc gac Ser Met Glu Asn Pro Gly Leu Trp Ile Leu Gly Cys His Asn Ser Asp 700 705 710 715	2163
ttc cgc aac cgc ggc atg acc gcc ctg ctg aag gtg agc agc tgc gac Phe Arg Asn Arg Gly Met Thr Ala Leu Leu Lys Val Ser Ser Cys Asp 720 725 730	2211
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gag gag gac cag cgc cag ggc gag ccc cgc aag aac ttc gtg aag Glu Glu Asp Gln Arg Gln Gly Ala Glu Pro Arg Lys Asn Phe Val Lys 905 910 915	2787

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gtg tgc cac acc aac acc ctg aac ccc gcc cac ggc cgc cag gtg acc Val Cys His Thr Asn Thr Leu Asn Pro Ala His Gly Arg Gln Val Thr 975 980 985	2979
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atc aac ggc tac atc atg gac acc ctg ccc ggc ctg gtg atg gcc cag Ile Asn Gly Tyr Ile Met Asp Thr Leu Pro Gly Leu Val Met Ala Gln 1040 1045 1050	3171
gac cag cgc atc cgc tgg tac ctg ctg agc atg ggc agc aac gag aac Asp Gln Arg Ile Arg Trp Tyr Leu Leu Ser Met Gly Ser Asn Glu Asn 1055 1060 1065	3219
atc cac agc atc cac ttc agc ggc cac gtg ttc acc gtg cgc aag aag Ile His Ser Ile His Phe Ser Gly His Val Phe Thr Val Arg Lys Lys 1070 1075 1080	3267
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ctg atc ggc gag cac ctg cac gcc ggc atg agc acc ctg ttc ctg gtg Leu Ile Gly Glu His Leu His Ala Gly Met Ser Thr Leu Phe Leu Val 1120 1125 1130	3411
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4381

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4396

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Cys Phe Ser Ala Thr Arg Arg Tyr Tyr Leu Gly Ala Val Glu Leu Ser
20 25 30
Trp Asp Tyr Met Gln Ser Asp Leu Gly Glu Leu Pro Val Asp Ala Arg
35 40 45
Phe Pro Pro Arg Val Pro Lys Ser Phe Pro Phe Asn Thr Ser Val Val
50 55 60
Tyr Lys Lys Thr Leu Phe Val Glu Phe Thr Asp His Leu Phe Asn Ile
65 70 75 80
Ala Lys Pro Arg Pro Pro Trp Met Gly Leu Leu Gly Pro Thr Ile Gln
85 90 95
Ala Glu Val Tyr Asp Thr Val Val Ile Thr Leu Lys Asn Met Ala Ser
100 105 110
His Pro Val Ser Leu His Ala Val Gly Val Ser Tyr Trp Lys Ala Ser
115 120 125
Glu Gly Ala Glu Tyr Asp Asp Gln Thr Ser Gln Arg Glu Lys Glu Asp
130 135 140
Asp Lys Val Phe Pro Gly Gly Ser His Thr Tyr Val Trp Gln Val Leu
145 150 155 160
Lys Glu Asn Gly Pro Met Ala Ser Asp Pro Leu Cys Leu Thr Tyr Ser
165 170 175
Tyr Leu Ser His Val Asp Leu Val Lys Asp Leu Asn Ser Gly Leu Ile
180 185 190
Gly Ala Leu Leu Val Cys Arg Glu Gly Ser Leu Ala Lys Glu Lys Thr
195 200 205
Gln Thr Leu His Lys Phe Ile Leu Leu Phe Ala Val Phe Asp Glu Gly
210 215 220
Lys Ser Trp His Ser Glu Thr Lys Asn Ser Leu Met Gln Asp Arg Asp
225 230 235 240
Ala Ala Ser Ala Arg Ala Trp Pro Lys Met His Thr Val Asn Gly Tyr
245 250 255
Val Asn Arg Ser Leu Pro Gly Leu Ile Gly Cys His Arg Lys Ser Val
260 265 270
Tyr Trp His Val Ile Gly Met Gly Thr Thr Pro Glu Val His Ser Ile
275 280 285
Phe Leu Glu Gly His Thr Phe Leu Val Arg Asn His Arg Gln Ala Ser
290 295 300
Leu Glu Ile Ser Pro Ile Thr Phe Leu Thr Ala Gln Thr Leu Leu Met
305 310 315 320
Asp Leu Gly Gln Phe Leu Leu Phe Cys His Ile Ser Ser His Gln His
325 330 335
Asp Gly Met Glu Ala Tyr Val Lys Val Asp Ser Cys Pro Glu Glu Pro
340 345 350
Gln Leu Arg Met Lys Asn Asn Glu Glu Ala Glu Asp Tyr Asp Asp Asp
355 365

Leu Thr Asp Ser Glu Met Asp Val Val Arg Phe Asp Asp Asp Asn Ser
370 375 380
Pro Ser Phe Ile Gln Ile Arg Ser Val Ala Lys Lys His Pro Lys Thr
385 390 395 400
Trp Val His Tyr Ile Ala Ala Glu Glu Asp Trp Asp Tyr Ala Pro
405 410 415
Leu Val Leu Ala Pro Asp Asp Arg Ser Tyr Lys Ser Gln Tyr Leu Asn
420 425 430
Asn Gly Pro Gln Arg Ile Gly Arg Lys Tyr Lys Val Arg Phe Met
435 440 445
Ala Tyr Thr Asp Glu Thr Phe Lys Thr Arg Glu Ala Ile Gln His Glu
450 455 460
Ser Gly Ile Leu Gly Pro Leu Leu Tyr Gly Glu Val Gly Asp Thr Leu
465 470 475 480
Leu Ile Ile Phe Lys Asn Gln Ala Ser Arg Pro Tyr Asn Ile Tyr Pro
485 490 495
His Gly Ile Thr Asp Val Arg Pro Leu Tyr Ser Arg Arg Leu Pro Lys
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Gly Val Lys His Leu Lys Asp Phe Pro Ile Leu Pro Gly Glu Ile Phe
515 520 525
Lys Tyr Lys Trp Thr Val Thr Val Glu Asp Gly Pro Thr Lys Ser Asp
530 535 540
Pro Arg Cys Leu Thr Arg Tyr Tyr Ser Ser Phe Val Asn Met Glu Arg
545 550 555 560
Asp Leu Ala Ser Gly Leu Ile Gly Pro Leu Leu Ile Cys Tyr Lys Glu
565 570 575
Ser Val Asp Gln Arg Gly Asn Gln Ile Met Ser Asp Lys Arg Asn Val
580 585 590
Ile Leu Phe Ser Val Phe Asp Glu Asn Arg Ser Trp Tyr Leu Thr Glu
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Asn Ile Gln Arg Phe Leu Pro Asn Pro Ala Gly Val Gln Leu Glu Asp
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Pro Glu Phe Gln Ala Ser Asn Ile Met His Ser Ile Asn Gly Tyr Val
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Phe Asp Ser Leu Gln Leu Ser Val Cys Leu His Glu Val Ala Tyr Trp
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Tyr Ile Leu Ser Ile Gly Ala Gln Thr Asp Phe Leu Ser Val Phe Phe
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Ser Gly Tyr Thr Phe Lys His Lys Met Val Tyr Glu Asp Thr Leu Thr
675 680 685
Leu Phe Pro Phe Ser Gly Glu Thr Val Phe Met Ser Met Glu Asn Pro
690 695 700
Gly Leu Trp Ile Leu Gly Cys His Asn Ser Asp Phe Arg Asn Arg Gly
705 710 715 720
Met Thr Ala Leu Leu Lys Val Ser Ser Cys Asp Lys Asn Thr Gly Asp
725 730 735
Tyr Tyr Glu Asp Ser Tyr Glu Asp Ile Ser Ala Tyr Leu Leu Ser Lys
740 745 750
Asn Asn Ala Ile Glu Pro Arg Arg Arg Arg Glu Ile Thr Arg Thr
755 760 765
Thr Leu Gln Ser Asp Gln Glu Ile Asp Tyr Asp Asp Thr Ile Ser
770 775 780
Val Glu Met Lys Lys Glu Asp Phe Asp Ile Tyr Asp Glu Asp Glu Asn
785 790 795 800
Gln Ser Pro Arg Ser Phe Gln Lys Lys Thr Arg His Tyr Phe Ile Ala
805 810 815
Ala Val Glu Arg Leu Trp Asp Tyr Gly Met Ser Ser Ser Pro His Val
820 825 830
Leu Arg Asn Arg Ala Gln Ser Gly Ser Val Pro Gln Phe Lys Lys Val
835 840 845
Val Phe Gln Glu Phe Thr Asp Gly Ser Phe Thr Gln Pro Leu Tyr Arg
850 855 860
Gly Glu Leu Asn Glu His Leu Gly Leu Leu Gly Pro Tyr Ile Arg Ala
865 870

Glu Val Glu Asp Asn Ile Met Val Thr Phe Arg Asn Gln Ala Ser Arg
885 890 895
Pro Tyr Ser Phe Tyr Ser Ser Leu Ile Ser Tyr Glu Glu Asp Gln Arg
900 905 910
Gln Gly Ala Glu Pro Arg Lys Asn Phe Val Lys Pro Asn Glu Thr Lys
915 920 925
Thr Tyr Phe Trp Lys Val Gln His His Met Ala Pro Thr Lys Asp Glu
930 935 940
Phe Asp Cys Lys Ala Trp Ala Tyr Phe Ser Asp Val Asp Leu Glu Lys
945 950 955 960
Asp Val His Ser Gly Leu Ile Gly Pro Leu Leu Val Cys His Thr Asn
965 970 975
Thr Leu Asn Pro Ala His Gly Arg Gln Val Thr Val Gln Glu Phe Ala
980 985 990
Leu Phe Phe Thr Ile Phe Asp Glu Thr Lys Ser Trp Tyr Phe Thr Glu
995 1000 1005
Asn Met Glu Arg Asn Cys Arg Ala Pro Cys Asn Ile Gln Met Glu Asp
1010 1015 1020
Pro Thr Phe Lys Glu Asn Tyr Arg Phe His Ala Ile Asn Gly Tyr Ile
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Met Asp Thr Leu Pro Gly Leu Val Met Ala Gln Asp Gln Arg Ile Arg
1045 1050 1055
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Phe Ser Gly His Val Phe Thr Val Arg Lys Lys Glu Glu Tyr Lys Met
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Ala Leu Tyr Asn Leu Tyr Pro Gly Val Phe Glu Thr Val Glu Met Leu
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Pro Ser Lys Ala Gly Ile Trp Arg Val Glu Cys Leu Ile Gly Glu His
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Gln Thr Pro Leu Gly Met Ala Ser Gly His Ile Arg Asp Phe Gln Ile
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Gly Ile Lys His Asn Ile Phe Asn Pro Pro Ile Ile Ala Arg Tyr Ile
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Gly Lys Val Lys Val Phe Gln Gly Asn Gln Asp Ser Phe Thr Pro Val
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Val Asn Ser Leu Asp Pro Pro Leu Leu Thr Arg Tyr Leu Arg Ile His
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Pro Gln Ser Trp Val His Gln Ile Ala Leu Arg Met Glu Val Leu Gly
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Cys Glu Ala Gln Asp Leu Tyr
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Leu Asn Glu His Leu Gly Leu Leu Gly Pro Tyr Ile Arg Ala Glu Val
865 870 875 880
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900 905 910
Ala Glu Pro Arg Lys Asn Phe Val Lys Pro Asn Glu Thr Lys Thr Tyr
915 920 925
Phe Trp Lys Val Gln His His Met Ala Pro Thr Lys Asp Glu Phe Asp
930 935 940
Cys Lys Ala Trp Ala Tyr Phe Ser Asp Val Asp Leu Glu Lys Asp Val
945 950 955 960
His Ser Gly Leu Ile Gly Pro Leu Leu Val Cys His Thr Asn Thr Leu
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Tyr Asn Leu Tyr Pro Gly Val Phe Glu Thr Val Glu Met Leu Pro Ser
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Lys Ala Gly Ile Trp Arg Val Glu Cys Leu Ile Gly Glu His Leu His
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Ala Gly Met Ser Thr Leu Phe Leu Val Tyr Ser Asn Lys Cys Gln Thr
1125 1130 1135
Pro Leu Gly Met Ala Ser Gly His Ile Arg Asp Phe Gln Ile Thr Ala
1140 1145 1150
Ser Gly Gln Tyr Gly Gln Trp Ala Pro Lys Leu Ala Arg Leu His Tyr
1155 1160 1165
Ser Gly Ser Ile Asn Ala Trp Ser Thr Lys Glu Pro Phe Ser Trp Ile
1170 1175 1180
Lys Val Asp Leu Leu Ala Pro Met Ile Ile His Gly Ile Lys Thr Gln
1185 1190 1195 1200
Gly Ala Arg Gln Lys Phe Ser Ser Leu Tyr Ile Ser Gln Phe Ile Ile
1205 1210 1215
Met Tyr Ser Leu Asp Gly Lys Trp Gln Thr Tyr Arg Gly Asn Ser
1220 1225 1230
Thr Gly Thr Leu Met Val Phe Phe Gly Asn Val Asp Ser Ser Gly Ile
1235 1240 1245
Lys His Asn Ile Phe Asn Pro Pro Ile Ile Ala Arg Tyr Ile Arg Leu
1250 1255 1260
His Pro Thr His Tyr Ser Ile Arg Ser Thr Leu Arg Met Glu Leu Met
1265 1270 1275 1280
Gly Cys Asp Leu Asn Ser Cys Ser Met Pro Leu Gly Met Glu Ser Lys
1285 1290 1295
Ala Ile Ser Asp Ala Gln Ile Thr Ala Ser Ser Tyr Phe Thr Asn Met
1300 1305 1310
Phe Ala Thr Trp Ser Pro Ser Lys Ala Arg Leu His Leu Gln Gly Arg
1315 1320 1325
Ser Asn Ala Trp Arg Pro Gln Val Asn Asn Pro Lys Glu Trp Leu Gln
1330 1335 1340
Val Asp Phe Gln Lys Thr Met Lys Val Thr Gly Val Thr Thr Gln Gly
1345 1350 1355 1360
Val Lys Ser Leu Leu Thr Ser Met Tyr Val Lys Glu Phe Leu Ile Ser
1365 1370 1375